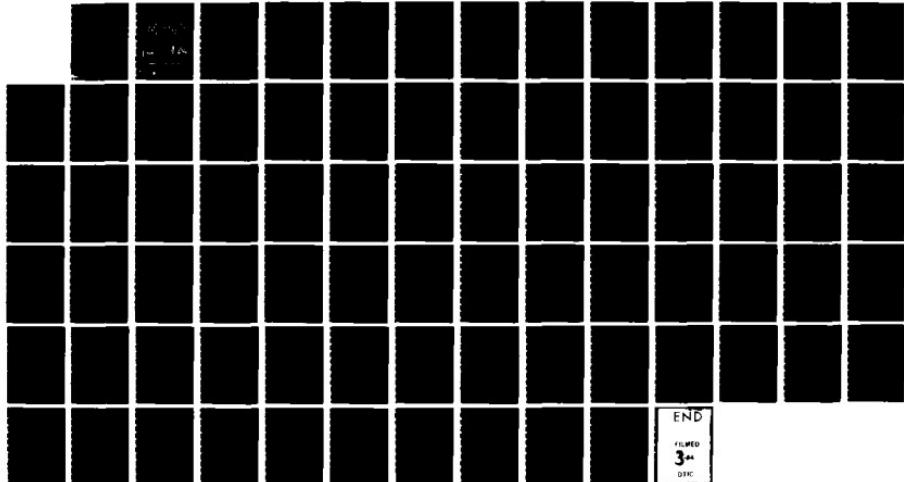


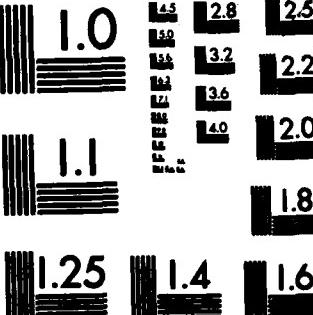
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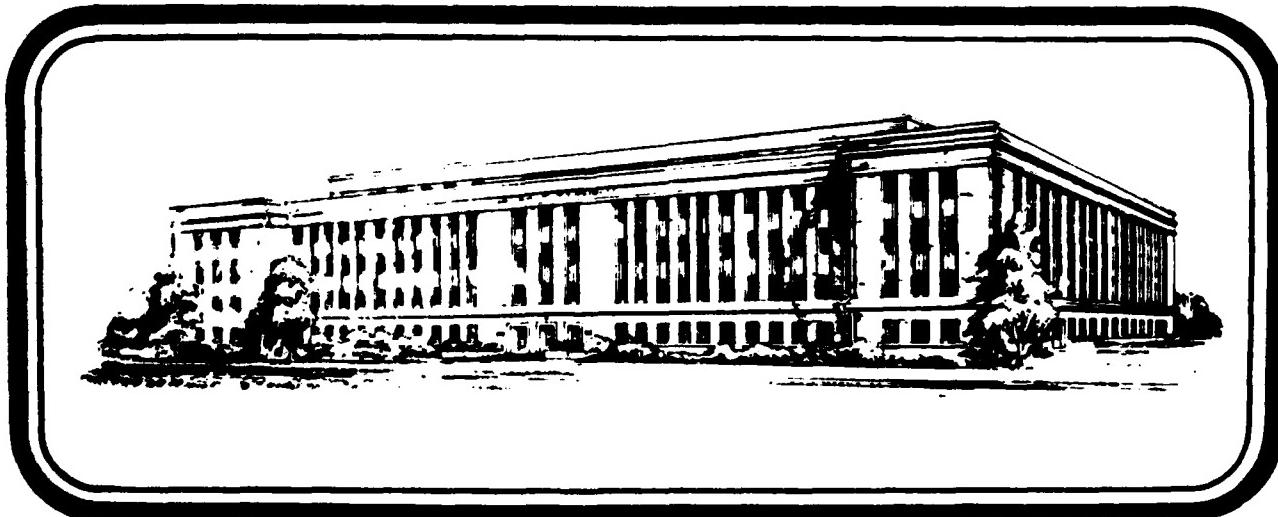
INDUSTRIAL COLLEGE OF THE ARMED FORCES

MSP 21

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**MOBILIZATION AND DEFENSE MANAGEMENT  
TECHNICAL REPORTS SERIES**

**SERVICE METHODS FOR DETERMINING  
INVENTORY AND MOBILIZATION  
NUMERICAL REQUIREMENTS FOR  
WEAPON SYSTEMS**



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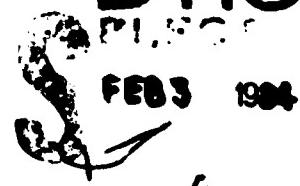
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INDUSTRIAL COLLEGE OF THE ARMED FORCES  
NATIONAL DEFENSE UNIVERSITY

SERVICE METHODS FOR DETERMINING  
INVENTORY AND MOBILIZATION  
NUMERICAL REQUIREMENTS FOR WEAPON SYSTEMS

by

DAVID L. ASBURY, LTC, USA  
EDWARD A. DUFF, LTC, USAF  
JOE L. HICKS, COL, USAF  
CAROL MORRIS, DLA  
ELRAY WHITEHOUSE, LTC, USA

A RESEARCH REPORT SUBMITTED TO THE FACULTY  
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RESEARCH SUPERVISOR: COL WALTER J. RABE, USAF

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**ABSTRACT OF STUDENT RESEARCH REPORT  
INDUSTRIAL COLLEGE OF THE ARMED FORCES**

<b>NAME OF RESEARCHER (S)</b> ASBURY, DAVID L., LTC, USA DUFF, EDWARD A., LTC, USAF HICKS, JOE L., COL, USAF MORRIS, CAROL, DLA WHITEHOUSE, ELRAY P., LTC, USA	<b>TITLE OF REPORT</b> Service Methods for Determining Inventory and Mobilization Numerical Requirements for Weapon Systems
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**ABSTRACT**

**Problem Statement.** The lack of a clear definition of wartime requirements for weapon systems is a major problem in establishing mobilization capacity to support defense needs. At present, each service has its own method of determining, prioritizing, and programming to acquire mobilization inventory requirements. These service requirements determination processes are not clear and are misunderstood. Responsibilities are fragmented, a lack of comparability of need exists, and industrial preparedness requirements are not put in perspective.

**Findings/Conclusions.** Based on an analysis of the requirements planning process, we reached the fol'wing conclusions:

1. All service requirements for weapon systems or consumables are driven by force structure.
  2. Force structure requirement decisions at all levels of the process, but particularly at the fiscally constrained levels, seem to be based on decisions of senior defense and military leaders weighing many factors of which quantitative analysis is only one.
  3. The Army and Marine Corps are authorized war reserve stocks for major weapon systems; the Air Force and Navy are not. This inconsistency has an impact on the attrition rates used by ali four services.
  4. Planning for mobilization requirements is very limited.
  5. Peacetime force programming constrains military requirements to fit within fiscal resources.
  6. The requirements for building the Program Force or the Planning Force are based on several factors.
    - a. Defense Guidance on strategy
    - b. Outyear threat quality and quantity
    - c. Modernization of our forces
    - d. Force structure growth
    - e. Force sustainability and readiness enhancements
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Recommendations.

1. The services should define and enunciate a mobilization requirement for weapon systems clearly linked to the threat.
2. OSD and the services should use the JCS Planning Force as an interim requirement for total mobilization.
3. OSD should implement a more consistent policy for war reserve stocks of major weapon systems to remove the potential for bias that the current policy introduces into the attrition calculation process.
4. The Joint Staff should continue to improve its ability to assess the Planning and Program forces of the services and make recommendations for trade-offs to the JCS and OSD.
5. The JCS and the services should adopt a new process for determining weapon system requirements for mobilization. The system will determine a prioritized set of weapon systems and support requirements based on the following factors.
  - a. JSCP strategy guidance
  - b. Current and projected threat
  - c. Current and projected force structure
  - d. Interface with CINCs
  - e. Combat beyond D+180
  - f. Unconstrained funds
  - g. Interaction with industry

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## EXECUTIVE SUMMARY

This study reviews the DOD mobilization environment, discusses each service's weapon systems requirement determination process, identifies unique aspects of the service missions, examines critical areas where gaps in the requirements process exist, and recommends possible improvements in the overall DOD process. Alternatives to the current requirements process and the mobilization capacity requirements are also evaluated.

The study addresses four central questions. First, how does each service determine its inventory and mobilization requirements for weapon systems? Second, are the methods used by the services standard, similar, or significantly different? Third, how do the service requirement processes relate to OSD and JCS planning and control processes? Fourth, could alternate methods improve the requirements process and lead to better guidance to define the industrial capacity needed to meet mobilization requirements?

Using these questions as a guide, definitions of key terms to be used throughout the study are established in order to have a common frame of reference. The study reviews the JCS planning system and the DOD Planning, Programming, and Budgeting System because these systems affect the requirements determination processes of the services. The study then explores the requirements determination process of the Army, Air Force, Navy, and Marine Corps in order to form a basis for analysis and comparison.

A number of significant findings and conclusions resulted from analysis of the various approaches to requirements determination.

1. All service requirements for weapon systems or consumables are driven by force structure.
2. Force structure requirement decisions at all levels of the process, but particularly at the fiscally constrained levels, seem to be based on decisions of senior defense and military leaders weighing many factors of which qualitative analysis is only one.
3. The Army and Marine Corps are authorized war reserve stocks for major weapon systems; the Air Force and Navy are not. This inconsistency affects the attrition rates used by all four services.
4. Planning for mobilization requirements is very limited.
5. Peacetime force programming constrains military requirements to fit within fiscal resources.
6. The requirements for building the Program Force or the Planning Force are based on several factors.
  - a. Defense Guidance on strategy
  - b. Outyear threat quality and quantity
  - c. Modernization of our forces
  - d. Force structure growth
  - e. Force sustainability and readiness enhancements

Based upon the findings and conclusions, the study recommends the following actions.

1. The services should define and enunciate a mobilization requirement for weapon systems clearly linked to the threat.
2. OSD and the services should use the JCS Planning Force as an interim requirement for total mobilization.

3. OSD should implement a more consistent policy for war reserve stocks of major weapon systems to remove the potential for bias the current policy introduces into the attrition calculation process.

4. The Joint Staff should continue to improve its ability to assess the Planning and Program Forces of the services and make recommendations for trade-offs to the JCS and DOD.

5. The JCS and the services should adopt a new process for determining weapon system requirements for mobilization. The system will determine a prioritized set of weapon systems and support requirements based on the following factors.

- a. JSCP strategy guidance
- b. Current and projected threat
- c. Current and projected force structure
- d. Interface with the CINCs
- e. Combat beyond D+180
- f. Unconstrained funds
- g. Interaction with industry

CHAPTER I  
INTRODUCTION

PURPOSE

Major problems exist in establishing the mobilization capacity to support particular sectors of the defense establishment. The lack of a clear definition of wartime requirements for weapon systems is one of these problems. At present, each service has its own method of determining, prioritizing, and programming to acquire mobilization inventory requirements. Currently, these processes are not clearly stated and are often misunderstood. Responsibilities are fragmented, a lack of comparability of need exists, and industrial preparedness requirements are not put in perspective.

This study reviews the DOD mobilization environment, discusses each service's weapon systems requirement determination process, identifies unique aspects of the service missions, examines critical gaps in the requirements process, and recommends possible improvements in the overall process. Alternatives to the current requirements process and the mobilization capacity requirements are also evaluated. This study is an initial attempt to focus on the subject of the requirements determination process, that is, the determination of numbers of weapon systems necessary to support the services during wartime. The participants in the study were observers. The data were difficult to obtain, disagreements over interpretations occurred, and certain information and activities were omitted. Thus, factual errors may have occurred.

Our goal, however, was not only to conduct as precise a study as possible under the constraints, but also to invite comments, criticism, review, and revision with a view toward improving the subject processes.

#### SCOPE

To analyze and evaluate the weapon systems requirement determination process, we postulated a prolonged, conventional war based on various levels of mobilization. This included the entire spectrum up to global conflict. Strategic weapon systems that normally do not have a mobilization requirement were not considered. Expansion of manpower to meet the scenario requirements was assumed.

#### BACKGROUND

To establish a starting point it is essential that we define some key terms that will be used throughout this study. These definitions are drawn from The Dictionary of United States Military Terms for Joint Usage (25).

1. Military Requirement. "An established need justifying the timely allocation of resources to achieve a capability to accomplish approved military objectives, missions, or tasks." An "established need" may also be expressed as an objective force level, which is defined as "the level of military forces that needs to be attained within a finite time frame and resources level to accomplish approved military objectives, missions, or tasks."

The primary peacetime military objective is to deter enemy aggression. If deterrence fails, the military must be prepared to fight and bring the war to a conclusion favorable to the United States. Maintaining an active, fully

equipped force to meet all contingencies would be prohibitively expensive.

Thus, mobilization capability becomes significant.

2. Materiel Requirement. "Those quantities of equipment and supplies necessary to equip, provide a materiel pipeline, and sustain a service, formation, organization, or unit in the fulfillment of its purposes or tasks during a specified period."

3. Mobilization.

- a. The act of preparing for war or other emergencies through assembling and organizing national resources.
- b. The process by which the Armed Forces or part of them are brought to a state of readiness for war or other national emergency. This includes assembling and organizing personnel, supplies, and materiel for active military service.

4. Levels of Mobilization.

a. Selective Mobilization. Expansion of the active Armed Forces by mobilization of Reserve component units and/or individual reservists, by authority of Congress or the President, to satisfy an emergency requirement for a force tailored to meet that requirement, e.g., mobilization for domestic emergencies, such as civil disturbances or instances where Federal Armed Forces may be used to protect life or Federal property and functions or to prevent disruption of Federal activities.

b. Partial Mobilization. Expansion of the active Armed Forces (short of full mobilization) resulting from action by Congress or the President to mobilize Reserve component units and/or individual reservists to meet all or part of the requirements of a particular contingency or operational war plans or to meet requirements incident to hostilities.

c. Full Mobilization. Expansion of the active Armed Forces resulting from action by Congress and the President to mobilize all Reserve component units in the existing approved force structure, all individual reservists, and the materiel resources needed for their support.

d. Total Mobilization. Expansion of the active Armed Forces by the organization and/or generation of additional units or personnel beyond the existing approved active and reserve structures to respond to the requirement generated by the contingency, including mobilization of all national resources needed to create and sustain such forces.

e. War Reserve Materiel Requirement -- (DOD). "The quantity of an item, in addition to the M-day force materiel requirement, required to be in the military supply system on M-day in order to support planned mobilization, to expand the materiel pipeline, and to sustain in training, combat and combat support operations, as applicable, the approved United States force structure (active and reserve) and those Allied forces designated for United States materiel support, through the period and at the level of support prescribed for war materiel planning purposes" (25:354).

JCS Pub. 21, Mobilization Planning (33), points out that:

Expansion of the active Armed Forces under any of the types of mobilization listed includes, at least, the ability of the industrial base to meet mobilization requirements for production of selected items with existing growth to meet force requirements.

The capability of the United States to expand its active force rapidly and efficiently through mobilization is essential in deterring

potential enemies and in assuring U.S. allies. A potential enemy must be convinced that the United States can mobilize and project a total (Active and Reserve component) force in time to influence the early stages of conflict.

The deterrent value of U.S. Reserve components is predicated on their combat power, readiness, and ability to mobilize and be deployed to influence the early stages of a conflict. Mobilization capability is a key element of the deterrent value of U.S. Reserve components because it provides the rapid means to translate political or military intent into usable combat power.

The deterrent value of mobilization resides not only in Active and Reserve component readiness, but also in the resolve and preparedness of military and civilian leaders to rapidly expand the U.S. military capability beyond existing forces by converting civilian manpower and production capacities into military units and industrial warfighting capacities. The United States must sustain the capability to fight an expanded or protracted war against a numerically superior force and conclude the conflict on terms favorable to the United States. To sustain this conventional balance, the United States places great confidence in its capacity as a nation to redirect its civilian economy to expand and sustain military power. As such, total mobilization capability is a key factor in the national military strength.

Industrial preparedness can be addressed by looking at the "D-to-P" Curve, which is a keystone concept in planning for war. It requires different curves for consumables and nonconsumables (figure 1).

For nonconsumables, like tanks, aircraft, and ships, the requirement is generally best expressed in terms of numbers required on hand for use as a

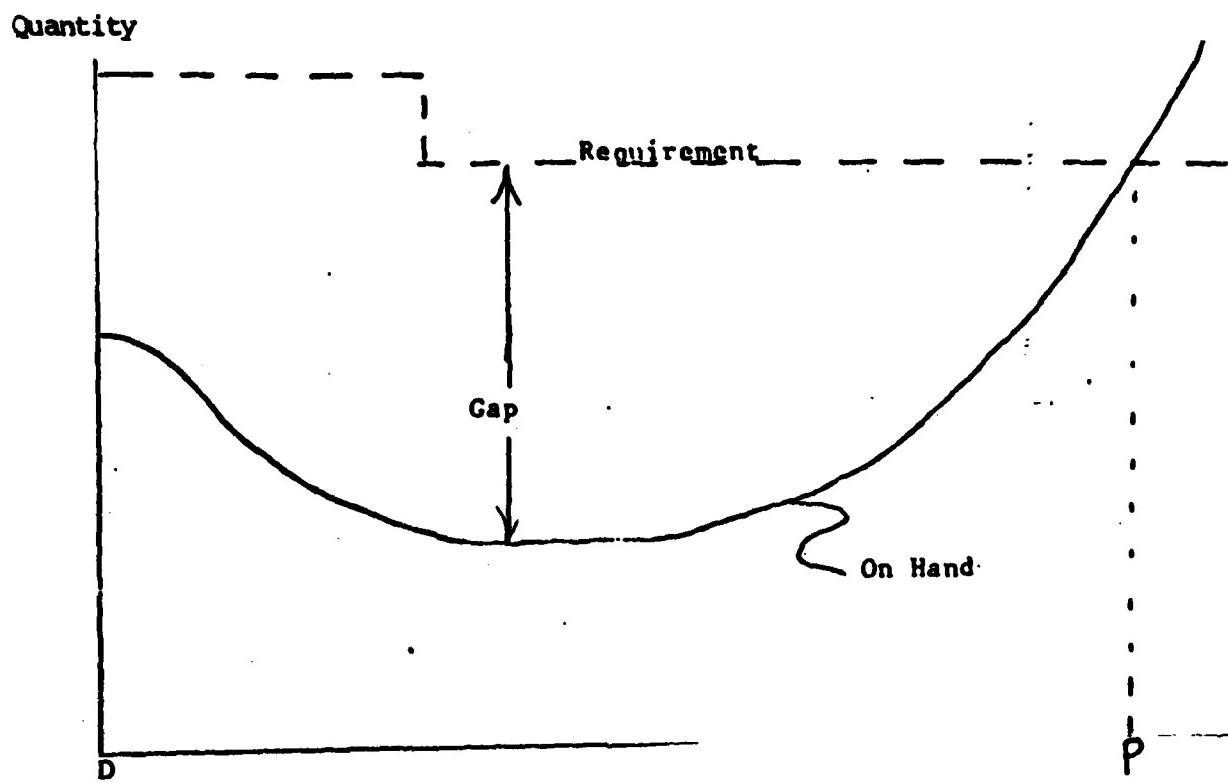


Figure 1  
Mobilization Status Curve - Nonconsumables

function of time. The dashed line of figure 1 represents the requirement quantity at any given point in time after D-day. The solid line represents the quantity on hand during the same period, and is determined by initial quantity depleted by losses and supplemented by production. The point at which the slope of this line goes to zero is the point where production rate equals loss rate, often discussed as the P-date. The shortfall on this curve is the greatest distance depicted between the on-hand and requirement curves.

The length of time by which industrial mobilization (M-day) precedes D-day is a key variable in determining the extent to which a given M-day inventory and post-M-day production response capability will satisfy a given projection of time-phased combat materiel demands. This headstart, or "industrial warning," enhances a timely U.S. decision to launch an all-out emergency expansion in the production of military materiel to satisfy anticipated requirements. The rate at which the nation can expand production of military materiel after M-day depends upon the following factors:

- a. The maximum capacity of the dedicated military materiel industrial production base existing on M-day or maintained at a "warm" base rate.
- b. The rate at which the base is producing (if at all).
- c. The technology embedded in that base--for example, the extent to which it is automated and thus less dependent on a large expansion of skilled labor force.
- d. The extent to which the nation has taken certain industrial preparedness measures that enhance the responsiveness of the production base (e.g., stocking long-lead components and materials).

- e. The availability of new materials, especially those imported.
- f. The quality of planning with private industry.
- g. The rate at which additional production capability can be obtained from private industry or new production capacity can be created after M-day.

Key among these factors are policies and criteria for investing in new production capacity and for retaining existing production capacity, planning with industry, and the extent to which various industrial preparedness measures have been taken before M-day to enhance the responsiveness of production facilities.

#### QUESTIONS

As a result of this background and discussion, the study group identified key questions to be addressed in the study:

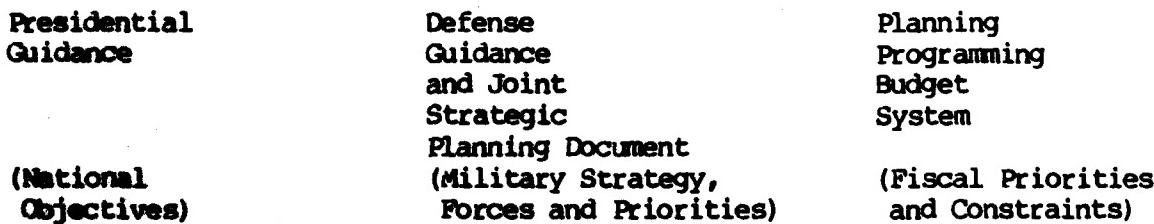
1. How does each service determine its inventory and mobilization requirements (the dashed line on figure 1) for weapon systems?
2. Are the methods used by the services standard, similar, or significantly different? What should they be?
3. How do the service requirement processes relate to Office of the Secretary of Defense (OSD), and Joint Chiefs of Staff (JCS) planning and control processes?
4. Could alternate methods improve the requirements process and lead to better guidance to define the industrial capacity needed to meet mobilization requirements?

## CHAPTER II

### REQUIREMENTS PLANNING - JCS AND DOD

"At the highest level, military requirements depend on the determination of the force levels and the 'mix' or composition of military forces best suited for attaining national defense objectives" (34:7).

Before examining the service methodologies described in Chapter III, it is necessary to understand the JCS planning system that converts national objectives into national military strategy to guide the service planning. The DOD Planning, Programming, and Budgeting System (PPBS) also affects service planning; by identifying mission requirements, matching them with resources, passing them through an intensive review process, and finally translating mission requirements into budget requests. The following discussion relates to that system depicted in figure 2. Much of the discussion is drawn from White and Hendrix, Defense Requirements and Resource Allocation (34).



**Figure 2**  
**The National Defense Process**

### JCS PLANNING SYSTEM

The Joint Strategic Planning System (JSPS) has two objectives. The first objective is force development, which builds forces to implement the strategy that the JCS develops to support national policy. The second objective is current operations planning, which also influences the statement of requirements by identifying force or resource shortfalls that preclude accomplishment of assignment objectives.

The planning period encompasses the upcoming Five Year Defense Program (FYDP) plus a ten-year extended planning period. In the planning phase the Joint Chiefs of Staff (JCS), after assessing the threat, develop the military strategy to achieve national security objectives.

The Joint Intelligence Estimate for Planning (JIEP) provides the principal intelligence basis for the development of the Joint Strategic Planning Document, Joint Program Assessment Memorandum, and the Joint Strategic Capabilities Plan. The JIEP contains estimative intelligence for the short-range and mid-range periods. It describes situations and developments that could affect U.S. security and estimates various global and regional threats, giving particular attention to the Warsaw Pact and Asian Communist military forces.

The Joint Strategic Planning Document (30) is prepared with the help of the military services, Defense agencies, and unified and specified commanders. The Joint Strategic Planning Document (JSPD) is the principal vehicle used by the Joint Chiefs of Staff to present their advice to the

President and the National Security Council on the military strategy and force structure required to support the attainment of the Nation's security objectives. The Joint Strategic Planning Document presents the advice of the Joint Chiefs of Staff derived principally from the Joint Strategic Planning Document Supporting Analysis, and internal JSPS document.

The Joint Strategic Planning Document provides a comprehensive military appraisal of the threat to U.S. interests and objectives worldwide, a statement of recommended military objectives derived from national security objectives, and the recommended military strategy required to attain national military objectives in the mid-range period. Mid-range is defined as three to eight years.

A summary of the Joint Chiefs of Staff planning force levels that are required to successfully execute, with responsible assurance of success, the approved national military strategy is included. Views on the attainability of these forces are reviewed in consideration of (1) fiscal, manpower, and material resources; (2) technology; and (3) peacetime industrial output. The JSPD appraisal also assesses the international environment and recommends a strategic concept for employment of military force in the mid-range period. The planning forces are used as a baseline against which the capability of the programmed force to execute the national military strategy is assessed and the associated risks identified.

Once the risk inherent in the programmed force has been assessed, the methodology is extended to an evaluation of the risk associated with the current force in existence. These assessments provide the foundation for

recommendations and changes to DOD force planning guidance. Among these recommendations are measures to reduce the most critical areas of risk between the programmed and planning forces.

The Joint Strategic Planning Document Supporting Analysis that provides the principal supporting analysis for the Joint Strategic Planning Document is in two parts: Part I, Strategy and Force Planning (31); and Part II, Analysis and Force Requirements (32). The services and other agencies support the JCS in the preparation of this document. In addition to analytical tools, such as war games and decision analysis techniques, considerable military judgment is used to develop the planning force level requirements. Prepared annually, the Joint Strategic Planning Document Supporting Analysis is timed to support the Joint Strategic Planning Document which is submitted to the Secretary of Defense as one of the first steps in the PPBS process (figure 3).

The Joint Strategic Capabilities Plan (28) provides guidance to the commanders of unified and specified commands and the chiefs of the services for accomplishing military tasks, based on projected military capabilities and conditions during the short-range (one year) period. It furnishes guidance on forces, logistics, intelligence, and the development of plans; and it assigns tasks to the commanders of unified and specified commands. Volume I includes concepts, tasks, and planning guidance. Volume II identifies the forces available for use in the development of operational plans. The Joint Strategic Capabilities Plan (JSCP) specifically allocates resources, but it overallocates. "Overallocates" in this context means that a resource has been planned for use in more than one operation. In the event that there are contingencies simultaneously in more than one location, the allocated resource

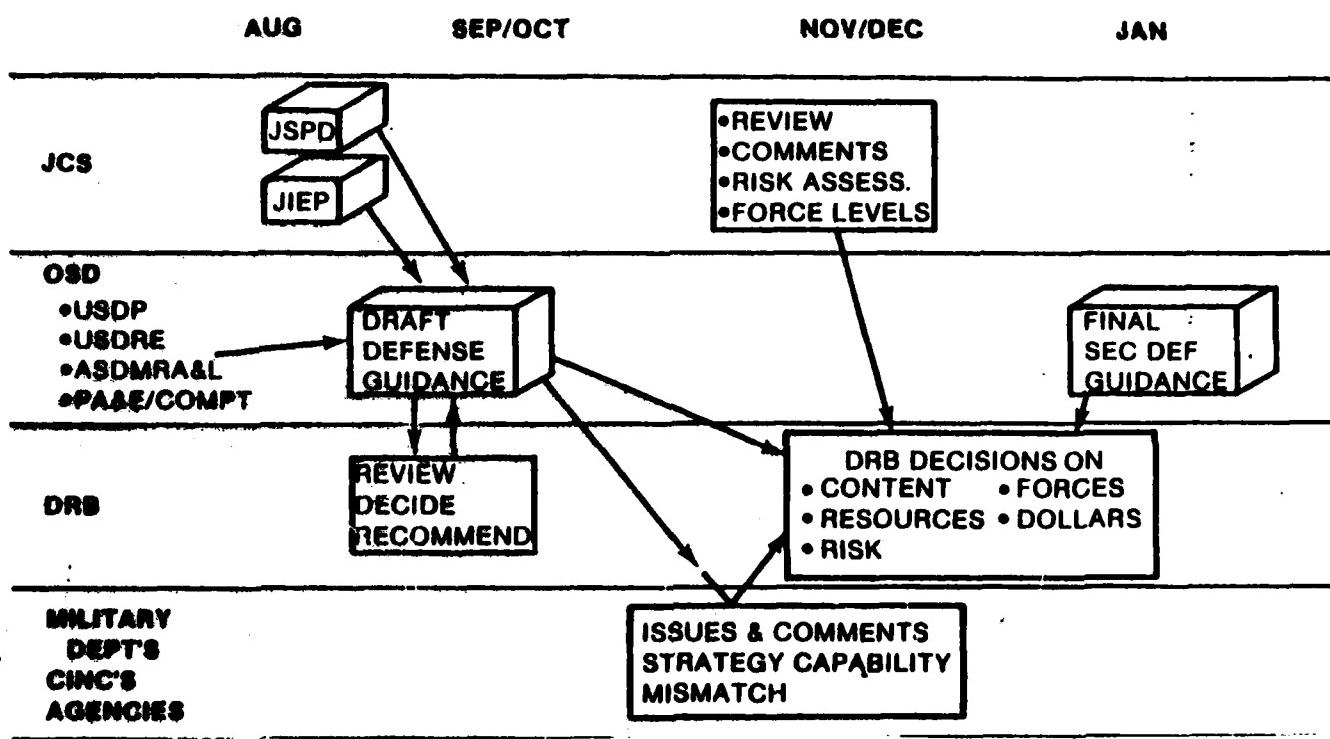


Figure 3  
DOD Planning Process

would be available to fulfill only one need. The capabilities plans of the Services are based on the JSCP.

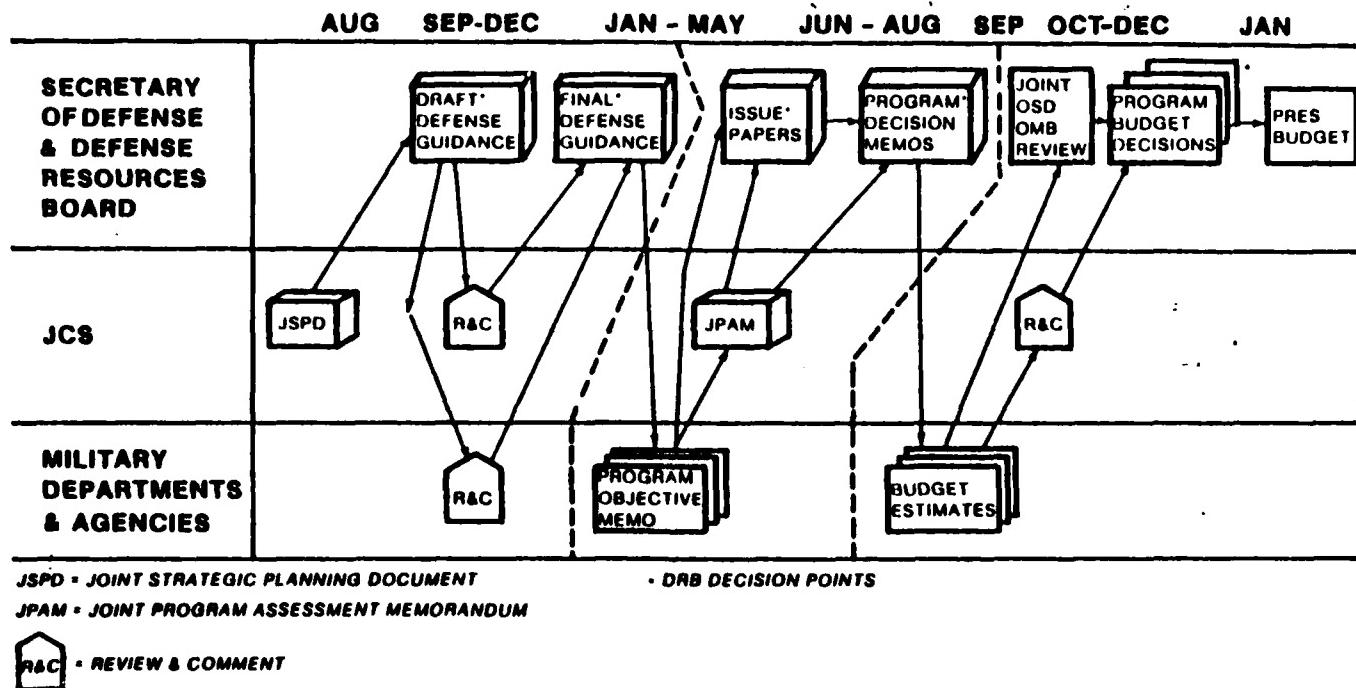
As the CINCs and component commanders formulate and assess those operational plans directed by the JSCP, they report force or support-level shortfalls to the JCS and the appropriate service. Appropriate reviews and planning decisions are then made through the DOD planning process.

Coordination with the services is obtained through the Defense Resources Board.

#### DOD PLANNING SYSTEM

The Planning, Programming, and Budgeting System (PPBS) converts the unconstrained requirements developed in the planning phase into budget-constrained programs. Priorities are also established through this process. The overall PPBS is depicted in figure 4.

The services and the defense agencies initiate the programming cycle, following the general directions set forth in the "Defense Guidance." The program objective memorandum (POM) is the major vehicle for DOD components to provide data and rationale for obtaining the resources needed to fulfill their missions. The services follow somewhat different procedures in arriving at their final version of the POM document. About midway in the programming cycle the JCS review the POM submissions in the Joint Program Assessment Memorandum. The OSD staff develop issue papers giving their views and sometimes challenging positions and data. The Defense Resources Board makes a final review of the POM submission. Throughout the programming phase close attention must be paid to costing and budgeting considerations so that plans stand a realistic chance of surviving later executive and congressional scrutiny.



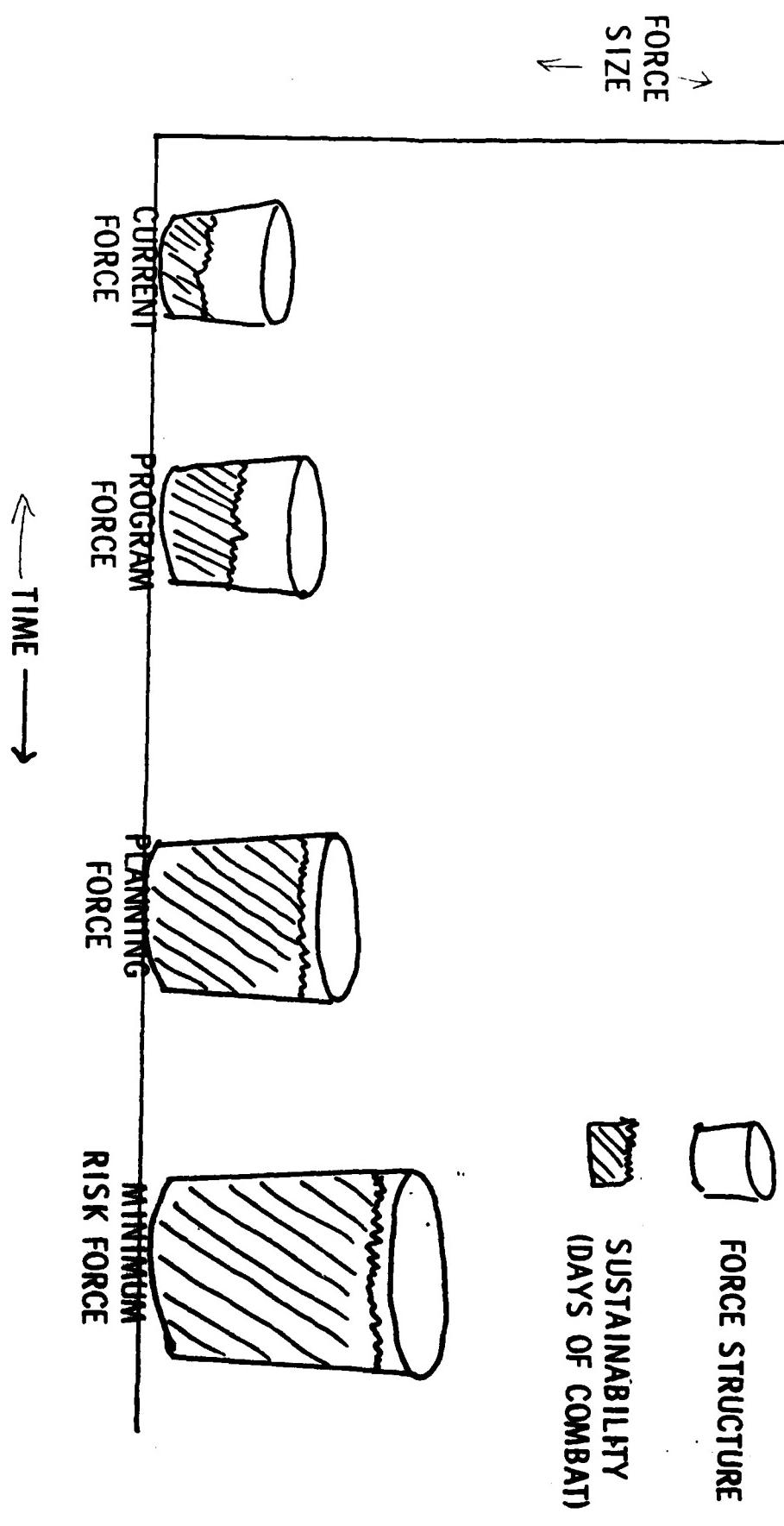
SOURCE: Adapted from diagram by Carl F. Reiter, Colonel, USA, *Planning, Programming, and Budgeting*, January 1982. Produced for use at the Industrial College of the Armed Forces, Washington, D.C.

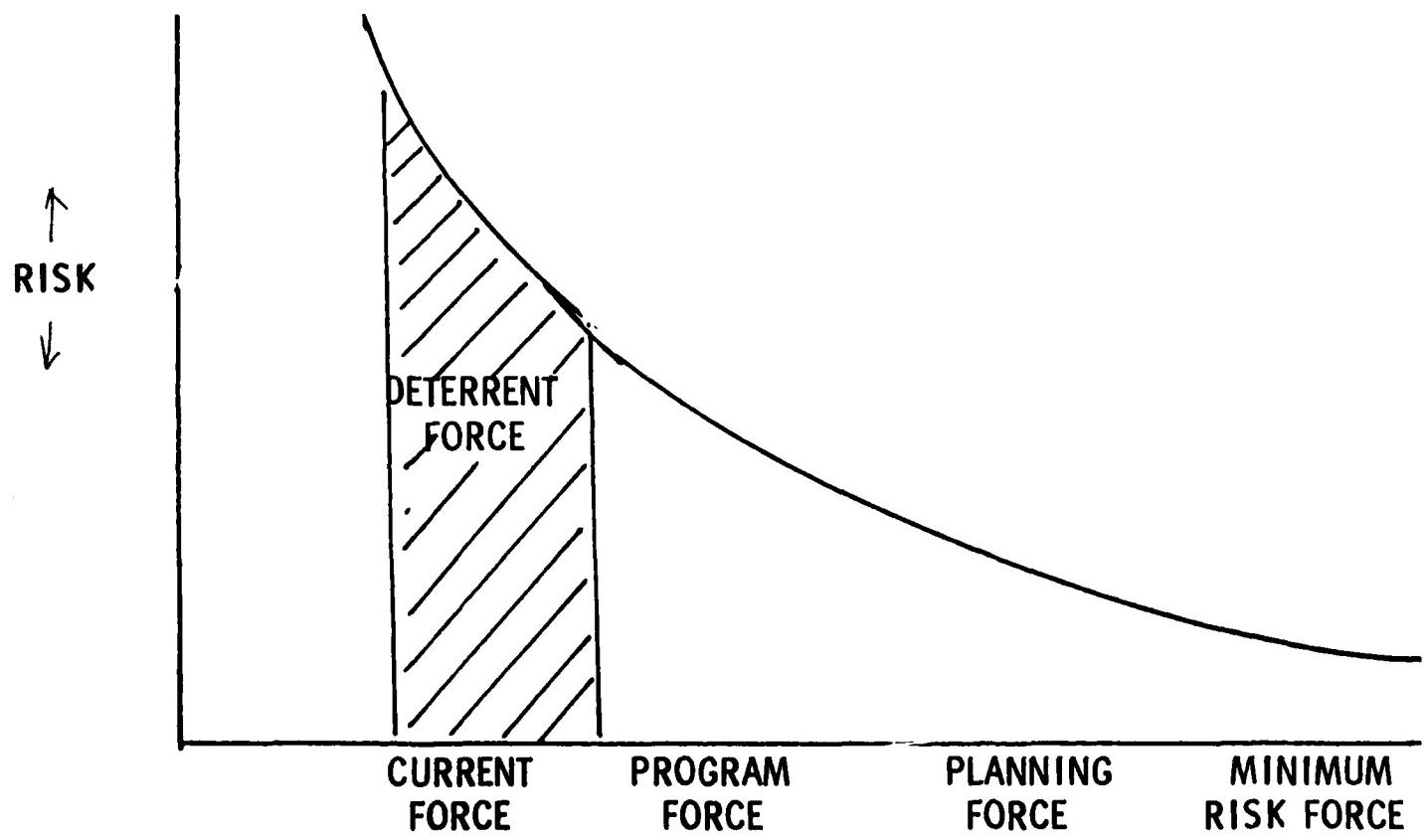
**Figure 4**  
**DOD Planning, Programming, and Budgeting System**

The Joint Program Assessment Memorandum (29) relating directly to the PPBS process aims to assist the Secretary of Defense in decisions on the defense program subsequent to the submission of the program objective memoranda by the services and other agencies. It assesses the composite POM force recommendations, including the views of the JCS on the balance and capabilities of the overall POM force and support levels to execute the approved national military strategy, and on the allocation of resources.

The products of this process are shown hypothetically in figure 5. Each force level is represented by a bucket. The buckets represent the relative size of each force. The water level in each bucket represents the provisioning of those forces i.e., how long they can fight. The minimum risk and planning forces are assumed to be fully equipped and supported. On the other hand, the program and budget forces are constrained fiscally, are short some equipment, and have provisioning shortfalls. Thus, they may fail to be adequately sustained for combat. Risk associated with each force level for this example is depicted in figure 6.

Although there is no rigorous analytical process for assessing risk, the chart in figure 6 illustrates how risk increases as force size decreases from the minimum-risk force. By definition, the minimum-risk force represents the military judgment of the JCS on the General Purpose forces to achieve the national military objectives, with minimum risk and without first use of nuclear weapon (32:I-3). The planning force provides "reasonable assurance of success" by sequencing operations between theaters. Note that the program





**Figure 6**  
**Risks Versus Force Size**

force and current force represent significantly more risk in the planning scenario. From the national viewpoint, deterrence of enemy aggression is a key objective. A band in figure 6 defines this force level. Inasmuch as United States has been successful since World War II in deterring major Soviet aggression, the current force has been adequate. Yet, the risk if the United States had to fight could be high.

White and Hendrix assess the success of the Joint Strategic Planning System as follows:

Despite the various measures that have been taken to make joint strategic planning more meaningful for the PPB process, the Joint Strategic Planning System does not mesh as well as defense managers might wish. In part this results from the fact that joint strategic plans are oriented primarily to meeting the threat while the PPB process must be based on real-world resource availability. Considering the world environment and U.S. domestic determinants of the level of defense over the past decade, the gap between plan and defense resource commitment is understandable (34:22).

## CHAPTER III

### SERVICE REQUIREMENTS PLANNING

This chapter describes the requirements determination process of each service -- Army, Navy, Marines, and Air Force. Analysis and comparison of these processes are discussed in Chapter IV.

#### Army

The Army participates in the Joint Strategic Planning System to determine its force structure. Analyzing the threat in each area produces a force requirement that uses the Army division as a base. The quantity and type of divisions required to support land combat operations are then included in the Joint Strategic Capabilities Plan (Chapter II). These forces are assumed to be fully equipped and supported.

Although this process provides a long-term force structure requirement, it is only the initial step in the generation of weapon system requirements. In structuring the force, the five-year, fiscally constrained planning window is used as the basis for the weapon system requirement determination process. Each year the last year of the five-year cycle is updated and analyzed using a computer model to determine weapon systems requirements.

The weapon systems requirements process continues with the breakdown of the force into the current year, budget year, and five program years. The Deputy Chief of Staff for Operations and Plans develops this structure and composition system (SACS) which is used by the other staff agencies as the basic force structure guidance.

The program force depicted in the last year of the five-year program is used to define weapon system requirements. This is known as the Approved Force Acquisition Object (AFAO).

The Approved Force Acquisition Objective (AFAO) is that quantity of materiel authorized and acquired to support U.S. and Allied Forces in peacetime and specified war reserve time frames. The elements of the AFAO are the following:

1. Peacetime Support Requirement. The Peacetime Support Period (PTSP) and its follow-on, the Balance Peacetime Support Period (BPTSP), together equal 24 months of support.
2. Supply Levels. On-hand and on-order.
3. War Reserve Materiel.

Certain categories of excesses are also authorized but have not been included in this brief outline.

The peacetime support requirements include the initial issue quantities and the projected maintenance support levels necessary to support the force in a peacetime environment. The supply levels consist of the requirements necessary to replace wornout systems in a timely manner. The War Reserve Materiel (WRM) requirements are those necessary to replace items attrited during conflict. Details of the WRM process are included in the appendix.

To summarize, the Army weapon systems requirement process moves first through the JCS long-term planning system where numbers and types of combat divisions are defined, secondly to a five-year programming window where peacetime equipping and support levels are determined within fiscal constraints, and finally to the addition of the attrition requirements for projected wartime losses.

The weapon system requirements are thus disconnected from the Planning and Minimum Risk force levels. The hardware determination process supports only the Program Objective Memorandum (POM) force.

#### AIR FORCE

This section describes in broad outline the process the Air Force uses to develop weapons systems requirements. We limit our discussion to major weapon systems, i.e., aircraft, because once the requirement for aircraft has been established, most other items of equipment are related to aircraft as a function of the number of aircraft or the sortie rates.

We were unable to find any process or methodology that developed the numbers of aircraft required for total mobilization. We can assume that total mobilization would be required in a global war against the Warsaw Pact. This section will describe how the Air Force assesses the threat in a global war and develops the Planning Force to counter the global threat. There was no indication, however, that the Air Force would use the Planning Force as the first statement of total mobilization requirements. We note that the FY 84-88 Defense Guidance suggests that the Planning Force be used as a starting point for developing total mobilization requirements.

"The services should begin total mobilization planning that includes force expansion requirements. The JCS Planning Force should be used as the initial basis for mobilization planning" (4:126).

It would take about two years before any increased aircraft output would be realized after industrial mobilization occurred (19:178). As figure 7 shows, it would take three years before any significant effect on force

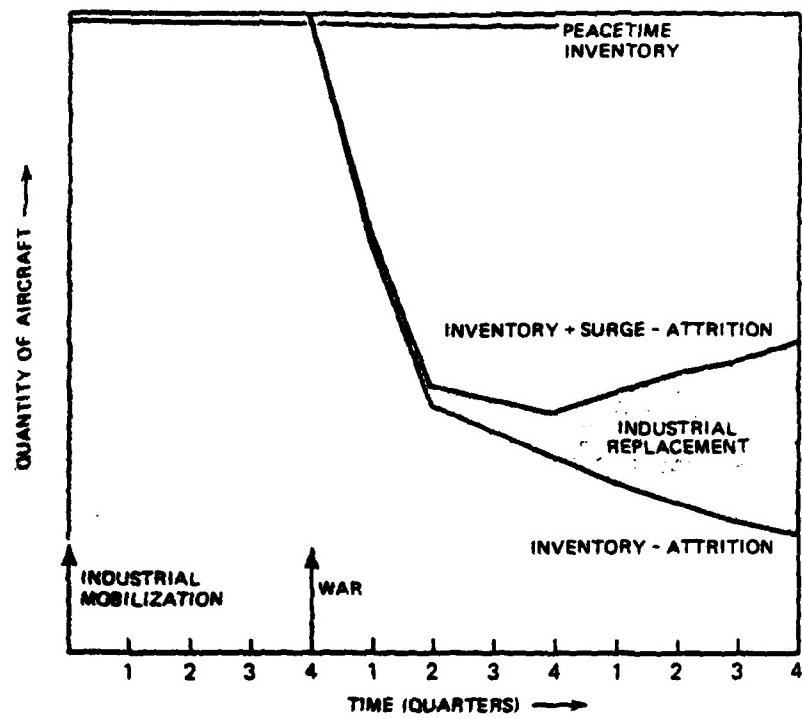


Figure 7  
Potential Response of Existing In-Use  
Air Force Production Lines to Mobilization

structure would be felt. The Air Force is similar to the Navy in believing that its goal should be to maintain forces capable of meeting the threat on a continuing basis within the constraints of affordability. The D to P time for aircraft is not as long as it would be for Navy ships, but it is long enough that the treatment of the requirements is similar. Because there are no mobilization requirements in existence, and because the Planning Force was to be the starting point for developing mobilization requirements, the Air Force planning process is reviewed here to establish the framework of the Air Force system and to allow a common departure point for analysis.

The first step in the Air Force planning process is the USAF Global Assessment, which looks twenty years into the future to assess regional and functional issues over the long term. It contains the background data, supporting analyses, and proposed objectives and strategies that the Secretary of the Air Force and the Chief of Staff use to develop the Planning Guidance Memorandum, which provides Air Staff planners broad guidance from the top. It covers only the most critical issues, designed to focus Air Force planning on future needs. The Strategy, Force and Capabilities Plan (SFCP) follows and provides the philosophical basis for Air Force inputs to the draft Defense Guidance.

Operations and intelligence officers at Air Force theater headquarters such as U.S. Air Forces Europe (USAFE) appraise the enemy threat to U.S. interests and objectives in their theater and build a statement of the forces required to execute their military strategy, the Minimum Risk Force (MRF).

The MRF is the starting point for the development of the Planning Force of the JSCP mentioned in Chapter II, and it provides a baseline for JCS and USAF force structure sizing.

Air Force Studies and Analysis (AF/SA) recently completed a study that reviewed the process used to develop the MRF for the tactical fighter forces (22).

In January 1982, the substance of a senior DOD leadership discussion on MRF requirements was "leaked" to the press. The wide disparity between MRF requirements and those upon which appropriations requests were based generated great public and congressional concern. At issue was the credibility of publicly acknowledged defense needs.

Congressional interest in service requirements and the services' credibility in expressing and validating their needs are important factors that directly affect the availability and distribution of budget dollars.

Measures of merit for an understandable MRF include a clear trail of auditable input data, a logical approach to sizing, and mathematical validity.

As a result of their study, AF/SA constructed an equation that accommodated the elements of current air-to-air and air-to-ground methodologies, isolated the element of risk and introduced partial sortie effectiveness. The AF/SA equation, which has been agreed to by the combat commands (USAFE, PACAF, CENCOM), follows.

$$\text{MRF} = \frac{(TGTS)(BS)(BG)}{(BK)(PSE)} \cdot \frac{BA}{1-(1-BA)} \cdot \frac{(BSR)(D)}{(RA)}$$

Where BA = USAF attrition rate  
BG = Goal (percentage of enemy ACFT share to be killed by day D)  
BK = USAF Kill Rate  
BS = Share (of Red ACFT threat for which USAF is responsible)  
BS = USAF sortie rate  
D = Days (to accomplish goal BG)  
PS = Partial Sortie Effectiveness  
RA = Commander's Risk Assessment Factor  
TGTS = Enemy aircraft (air-to-air); target Base (air-to-ground)

Force sizing against a level of risk is at best a subjective exercise.

Although many elements can be objectively determined or subjectively assessed, a "grey area" always remains for which only experience and "feel" can provide a numerical value. Potentially, kill rate, attrition rate, and sortie rate could be manipulated to define risk. However, they are well established planning factors. Altering their value could serve to confuse and make more difficult the job of defending military requirements. It is more practical and politic to use accepted planning values for all quantifiable terms of the MRF equation and isolate the element of risk in the term, "Risk Assessment" (RA). This term, the result of a commander's assessment of the force produced by the quantifiable terms of the equation, provides visibility to and permits evaluation of the "risk" envisioned.

To provide the command's maximum flexibility in defining their minimum risk force, and to ensure that their approach is auditable and defensible, the following three-step approach, using the equation shown above, is used:

Step 1. Letting the Commander's Risk Assessment Factor (RA) equal 1.0, a force size based on recognized JCS/AF planning data is determined.

Step 2. Again letting RA = 1.0, a force size is recalculated based on adjusting any factor(s) in the equation to the command's best estimate of the

individual values in the equation. Any values that differ from JCS/AF planning data are justified.

Step 3. The commander then adjusts RA to account for the effects of factors/imponderables not considered in the MRF equation. An RA value would be selected that produces a force of sufficient size to satisfy the command's concept of "virtual assurance." When the force size produced in this step is divided by that in Step 1, a Commander's Risk Assessment Factor is derived that quantifies his concept of "virtual assurance" relative to joint USAF-approved planning factors.

The full three-step process provides a means of identifying command disagreements with standard planning data, and their force structure implications.

The AF/SA review covered air-to-air and air-to-ground forces. Other factors including airlift, air refueling, reconnaissance, and electronic combat still need to be addressed. The AF/SA-developed methodology provides a consistent, understandable, documented approach to sizing the Tactical Minimum Risk Force, and a starting point for further MRF revisions.

The Air Staff's Force Structure Committee changes the Minimum Risk Force into the Planning Force by eliminating redundancies between MAJCOMs and accepting additional risk, prioritizing and sequencing operations where possible. The Air Force uses the same equation as used for MRF calculations, generally uses standard planning factors, but is more optimistic in the choice of numbers for kill rates. The force derived is characterized by more risk than the MRF.

The Planning Force is the yardstick that allows the Air Staff to tell the national leadership what it takes to execute the national strategy with a reasonable assurance of success. The lack of fiscal and industrial constraints on the Planning Force is deliberate so the Joint Staff can have a benchmark from which to assess the risk when a smaller force is funded. The current national strategy with its implications of near simultaneous worldwide war makes a close working relationship between the Air and Joint staffs very sensible. As an example, it is clear that the military airlift force structure requirements would be affected by Army and Navy closure and resupply needs. Working airlift as a joint problem helps each service to address its highest priority requirements.

The following list shows the areas for which Planning Forces (10) have been developed:

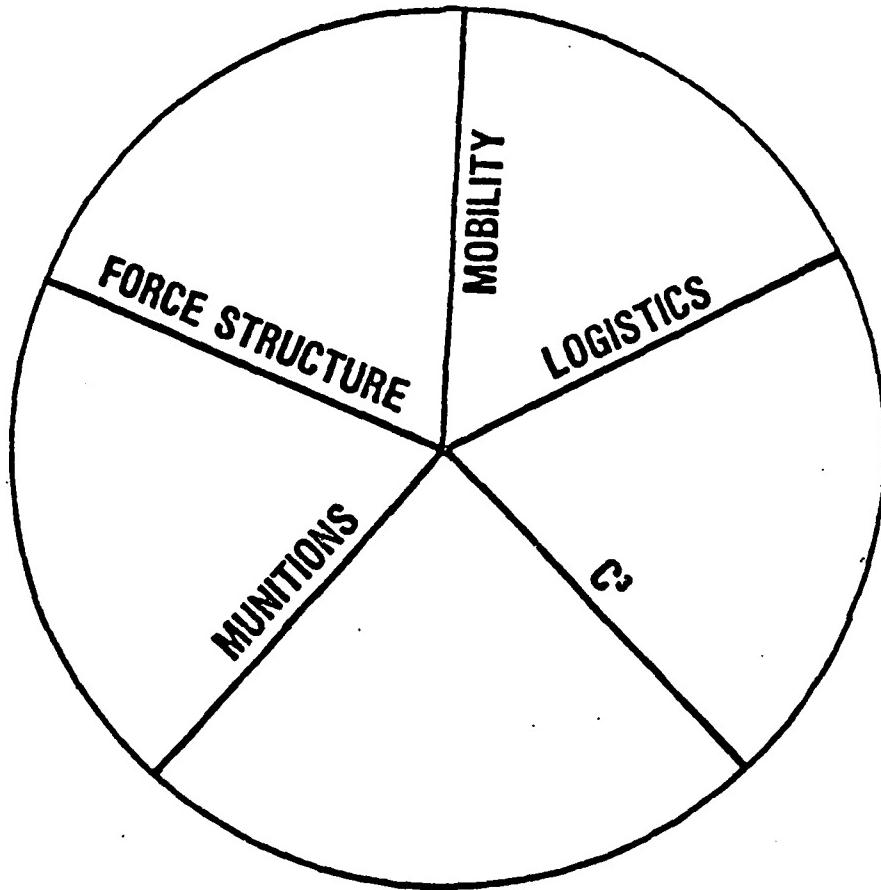
1. Tactical Fighter
2. Electronic Combat
3. Reconnaissance
4. Special Operations
5. Intermediate Nuclear
6. Strategic Offense
7. Strategic Defense
8. Mobility
9. Combat Rescue
10. Command and Control
11. Space Systems

The force levels described in the Air Force Planning Guide are processed by Mission Area Analysis (MAA) which assesses mission capabilities and validates the Planning Force (7). In describing this Analysis, a useful analogy is that of a wheel with spokes. To simplify again, figure 8 shows an

ideal wheel in which the force structure spoke is in correct proportion to the other spokes of munitions, logistics and runways. Mission Area Analysis helps find the out-of-round wheels as shown in figure 9 where more munitions are required. The size of the dotted wheels shows the smaller capability that exists when the shorter spokes are used to size the wheel.

The step down from the Planning Force to the forces required in the Program Objective Memorandum (POM) represents a decrease in numbers of aircraft. The Planning Force is fiscally unconstrained and emphasizes the forces needed to counter the specific threats. The programmed force is constrained by the size of the President's budget. Force structures as stated in the POM are not based on a structured methodology but rather are the result of rational military judgment making estimates of how many wings of aircraft will be funded in the prevailing political atmosphere. Aircraft buys are based on modernizing this force structure at a given average age and some small force growth.

We must point out the relationship between force structure and requirements for aircraft. The Air Force states force structure by the number of combat wings. The total numbers of combat aircraft available are determined by the distribution to combat requirements, training, pipeline needs, and peacetime attrition reserve (peacetime crashes) as shown in figure 10. This indicates that 60 percent of the aircraft procured go to modernize or build force structure. The others are used for training and maintenance of the force structure over the life of the aircraft. Once the Air Force has finalized its force structure the aircraft requirements question is answered.



**Figure 8**  
Mission Area Analysis Approach to  
A Balanced Program

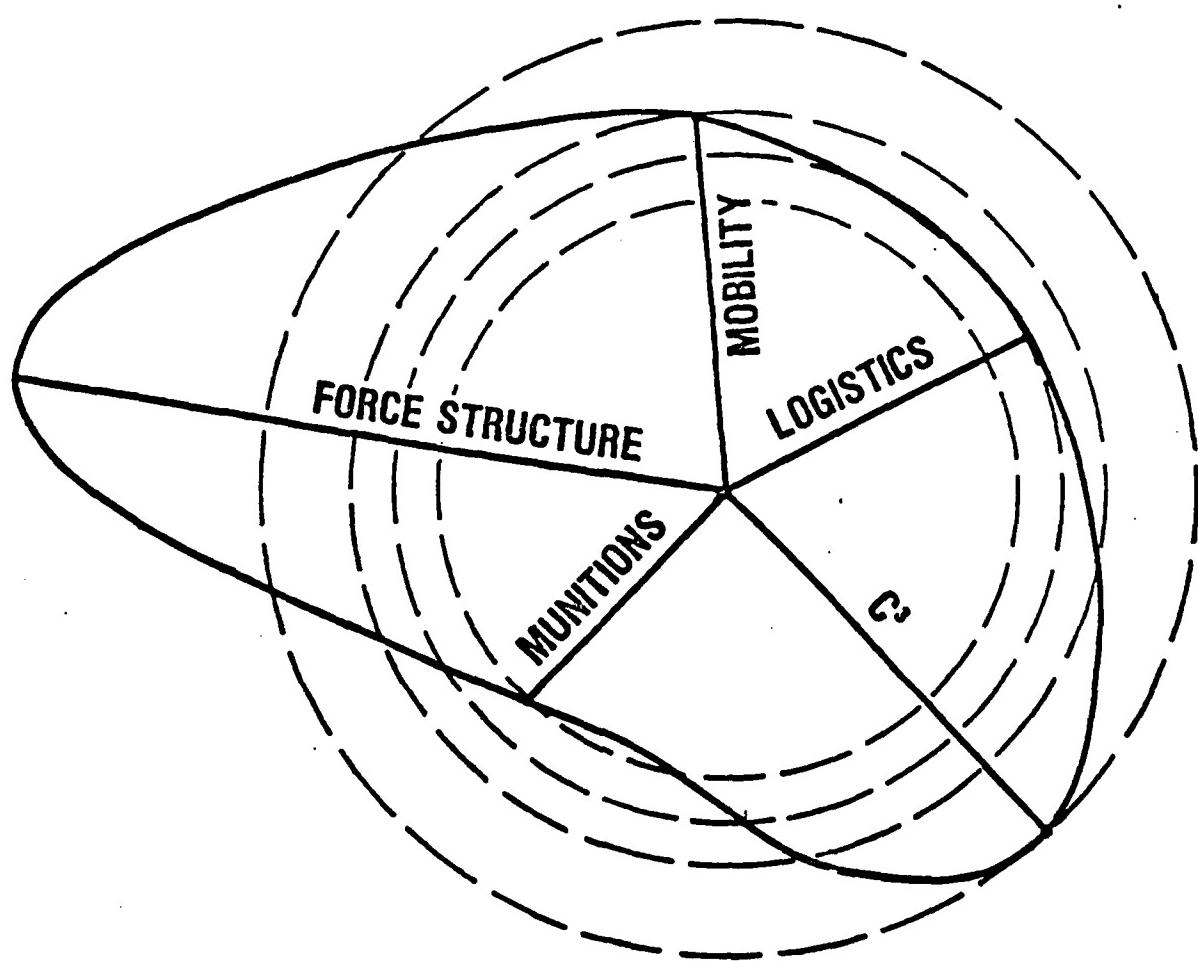
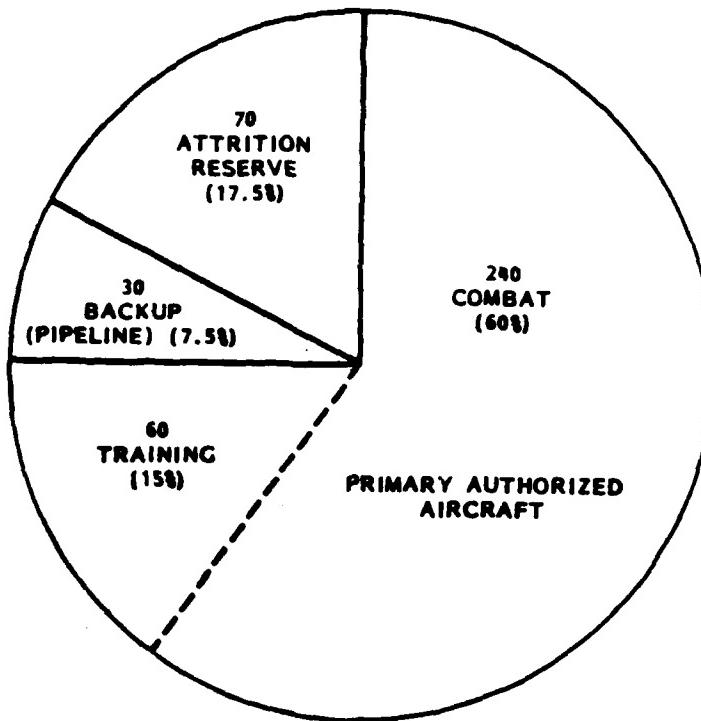


Figure 9  
Out-of-Round Wheel  
The Size of Dotted Wheels Show Smaller  
Capability Exists Because of Shorter Spokes



**Figure 10**  
Distribution of Tatical Fighter Aircraft Between  
Combat, Training, Pipeline, and Peacetime Attrition  
(400 Aircraft Buy)

No identifiable methodology exists to determine force structure. Military judgment of planners and key Air Force commanders, and tradeoffs due to affordability, drive the number of Air Force wings.

The force structure as stated in the POM reflects weapons systems requirements for full mobilization. At full mobilization the National Guard and Reserves as well as the active force will be called into action. The POM provides for full equipage and modernization of the National Guard and the Reserves. Requirements are not defined for total mobilization, but by definition we can accurately say that the POM states full mobilization requirements.

Once the number of wings is firm, the equipage for the wings is derived from what is required to support the aircraft. Tables of required equipment such as fuel trucks, fire trucks, ground maintenance equipment, and nearly every conceivable sort of spare part and materiel flow from the decision to support a given force of aircraft.

We noted some confusion in the term "mobilization requirements." Some officers used this term much differently than we have defined it, and we found one source that stated the Air Force computes its "mobilization requirements" for aircraft by using prime contractors' estimate of the maximum post-mobilization production rates attainable from existing facilities, rather than war-fighting requirement computations. For the F-15, the F-16, and the A-10, mobilization plans are to increase the plant output to its capacity; but no methodology exists that states that the mobilization requirement is a certain number of aircraft. The Air Force then adjusts the contractor estimates to

reflect production limitations of the producers of major components, such as engines, when they cannot attain the same production rate as the airframe producers.

For items other than aircraft, the Air Force Logistics Command is responsible for annually computing the monthly mobilization requirements. These requirements are based on projected wartime flying hours, aircraft sorties, material expenditures per sortie, and peacetime demand rates. Peacetime demand rates are used because the models to compute wartime demand rates have yet to be developed. The Air Force's current planning program is limited to three aircraft currently in production (A-10, F-15, and F-16) and about 130 associated war consumable items, such as munitions, fuel tanks, bomb racks, and pylons.

#### Navy

The Navy develops its force structure through the joint planning process, as discussed in Chapter II, with U.S. maritime superiority as its objective. "Maritime superiority" does not mean matching a potential enemy ship for ship, sailor for sailor. It means, rather, the capability to use U.S. advantage those maritime areas of the world when and where required. "Maritime superiority" means having confidence that those maritime tasks essential to U.S. security can be accomplished.

The aircraft carrier serves as the key member of the naval battle group, employing antisubmarine aircraft, attack and fighter aircraft, surface escorts, and nuclear submarines. These air, surface, and submarine units together provide the most effective combination of naval power that can be assembled to counter potential threats at sea.

The following discussion is limited to the aircraft carrier, because, once determined, the number of carriers, in fact, drives the requirement for other related key weapon systems, i.e., destroyers, tenders, and the required support logistics.

Department of the Navy planning personnel estimate the number fo carrier battle groups required to carry out current Navy missions on a global conflict basis. These estimates are based upon current national maritime strategy, current and projected threat and risk analyses, tactical simulations, and the collective experience and best military judgment of the Navy staff.

As discussed in Chapter II, forces are developed to accomplish Navy missions with a high probability of success (the minimum risk force) and also to accomplish Navy missions with a reasonable assurance of success (the planning force).

The result of this process is that fifteen carrier battle groups are required as the minimum essential force to accomplish the Navy mission. The present thirteen carrier battle groups are insufficient for the Navy to maneuver worldwide and successfully engage hostile forces in multiple vital areas. When the Navy reaches a fifteen-carrier battle group, which is the 600-ship Navy, it will then possess the maritime capability to perform its mission with prudent risk.

A sample deployment for carrier battle groups in the event of global conflict is shown in Table 1.

<u>Area</u>	<u>Carrier Battle Groups</u>
Indian Ocean	2 - 4
Mediterranean	2 - 4
North Atlantic	2 - 4
South Atlantic	1 - 2
Caribbean - Gulf of Mexico	1 - 2
Western Pacific	2 - 4
Mid-Eastern Pacific (Hawaii, Alaska)	<u>2 - 3</u>
Total	12 - 23

Table 1

**Sample Deployment of Carrier Battle Groups  
in the Event of Global Conflict**

A hypothetical carrier battle group requirement, therefore, based on the constraint of prudent risk, translates into a requirement for fifteen carrier battle groups. A key assumption is that the extensive procurement lead time for weapon systems such as the aircraft carrier make it virtually impossible for the industrial base to surge or affect the quantity on hand in a mobilization environment. The Navy goal is to maintain a fleet capable of meeting mission requirements on a continuing basis within the constraints of prudent risk and affordability.

The central office where the overall process for coordinating the planning and requirements for fleet readiness and force levels associated with tactical warfare is the Director of Naval Warfare (OP-095).

**MARINE CORPS**

The Marine Corps is the only one of the four military services that does not have its own Department. Consequently, all Marine Corps requirements are

funded by the Department of the Navy. In an attempt to distinguish Marine Corps Service requirements from Navy Service requirements, the Department of the Navy goes to great lengths to separate the requirements into two funding categories, one for the Navy and another for the Marines. This procedure is complicated by the fact that the Department of the Navy funding category for Marine aviation, communication security requirements, and other requirements jointly selected by the two services. Under these conditions the determination and sponsorship of those requirements then become the responsibility of the Navy, with active participation from the Marine Corps. Because the preceding section discussed how Navy requirements flow from the carrier battle groups, this section will address the requirements planning process only for the Marine Corps projects that are funded in the Marine category.

The force structure of the Marine Corps is determined by the National Security Act of 1947 and the Reorganization Act of 1958 (Title 10, USC). These acts state that the Marine Corps shall be organized as to include not less than three combat divisions and three air wings and such other land combat, aviation, and other services as may be organic therein. Section 5402, title 10 USC states: Except in time of war or national emergency declared by Congress after June 28, 1952, the authorized strength of the Regular Marine Corps, excluding retired members, is 400,000 personnel. The Marine Corps Current Force Structure is comprised of three active Marine Amphibious Forces (MAFs) (approximately 192,000 personnel) and one reserve Division Wing Team (DWT) (approximately 39,000 personnel). A MAF is normally built around a

division/wing/team. It may range in size from less than a complete division/wing/team up to three divisions and aircraft wings, together with an appropriate combat service support organization.

The Marine Corps follows the JCS planning process as described in Chapter II. The first Marine output we will mention is the Marine Corps Capabilities Plan, which assigns tasks for the short-range period under all conditions of war. It also provides planning guidance and instructions to commanders for the use and employment of resources that are made available to them. The Marine Corps Mid-Range Objectives Plan (MMROP) establishes the guidelines, concepts, requirements, and objectives necessary to accomplish statutory missions over a ten-year period. It is a parallel document to the Joint Strategic Planning Document (JSPD) and helps provide input to both the JSPD and the JSFDSA II. This plan focuses on the programmed force and directs Research and Development (R&D) efforts. The Marine Corps Long-Range Plan (MLRP) addresses ten to twenty years in the future. It sets forth broad concepts, planning objectives, and guidelines for the development of long-range studies. The plan is reviewed and revised every five years. An annual review is made of concepts of operation, organizational objectives, and national objectives.

Marines Corps requirements are not identified as mobilization requirements. The Marine Corps requirements for major weapon systems are based on force structure. In their MMROP this is emphasized by the following statement: The Marine Corps does not consider it necessary to develop standard force packages for response to potential contingency situations.

Rather, the Marine Corps will continue to capitalize upon the inherent flexibility of its force structure, and task organize to accomplish specific assigned missions. The Marine Corps makes the assumption that should mobilization occur, they will mobilize with their current force structure. Therefore, the requirements determination process computes the number of weapon systems using the current force structure as a base, and this will suffice for mobilization requirements.

The Marine Corps, in its extended planning process, computes the manpower level required during the midrange period to successfully accomplish its mission -- the Minimum Risk Force. The Planning Force, which is slightly reduced from the Minimum Risk Force to reduce redundancy, is still fiscally unconstrained. Fiscal constraints and further reductions to the Planning Force form the basis of the Program Objective Memorandum (POM) force. The Marine Corps Current Force Structure represents the part of the Program Force funded and in being today, active and reserves. It represents actual capabilities to meet actual contingencies and is the basis for operations and contingency plans and orders.

The process for computing mobilization requirements for replacing an existing weapon system would simply rely on a one-for-one replacement unless there was a known forthcoming change in structure or mission. The process or methodology for computing mobilization requirements for a new major weapon system begins with the MMRP. The plan, which is very broad in scope, is analyzed by mission area, of which there are approximately twenty-five. The replacement and attrition rates for the equipment are normally based on

historical Marine Corps data, Army equipment rates, or rates of similar equipment in operation. There are some high-dollar, low-density weapon systems for which no attrition rates are computed because it is not anticipated that the equipment would be lost in combat unless the entire unit is destroyed. In that case the equipment need not be replaced. The actual mobilization quantities required are determined by a computer program in the Logistics Management Information System (LMIS). These mobilization data are reflected in the Marine Corps Summary Item Readiness Study, Exhibit P20A. The total Inventory Objective is the fiscally unconstrained amount of equipment needed to support the Marine Corps requirements through D-180 days. Normally these requirements are computed using the current force. In a few exceptions the equipment will not be fielded for a number of years, and it has been determined that the force structure will probably increase by the fielding year. In that case, the requirements are computed using the expected program force structure.

The P20-A Exhibit is used in developing the POM. The POM, however, will reflect the mobilization requirements projected only through the time authorized by the Defense Guidance, rather than the full 180 days. The attrition or replacement factors for the consumption period computed or allowed represent the Marine Corps war reserve requirements.

Mobilization requirements for depot repairable equipments are directly related to the major weapon systems that have been approved for fielding. An initial package (two to three years) of spare/consumables is procured concurrently with the major weapon system. For weapon systems in use,

mobilization requirements for spares are computed using actual recorded peacetime consumption multiplied by a predetermined combat consumption rate and spread by thirty-day blocks throughout the approved scenario period.

The repairable spares and consumable spares must be for weapons classified as combat essential, and materiel procured as WRS is authorized only through the defined resupply period. Stocks for beyond that period will be procured/stocked only by the single DOD Integrated Manager (IM) for the items. The total War Materiel Requirement for D+180 is computed by the Marine Corps, but the amount beyond the resupply period is passed to the item manager for incorporation in his POM. For those few items where Marine Corps is the single DOD IM, they receive and incorporate the other services' WMR in their POM.

## CHAPTER IV

### ANALYSIS

#### COMPARISON AND EVALUATION OF SERVICE METHODS

The methods for computing requirements were compared for major weapon systems (tanks, aircraft, ships) and for consumables. The services' methods were compared in determining the planning force, the program force, the full mobilization force, and the total mobilization force. In examining the methods of determining requirements in use among the four services, a large number of similarities and a few basic differences were found.

In addition, several systemic problems, common to all services, were found. Highlights of the findings are listed here. Their consequences will be analyzed in the next section.

#### FINDINGS

1. All service requirements for weapon systems or consumables are driven by Force Structure. Once Force Structure is determined, the number of weapon systems or consumables follow directly from straightforward computations. For example, current force structures in the services would include those listed in Table 2.

Table 2  
CURRENT FORCE STRUCTURE

<u>Service</u>	<u>Force Structure Unit</u>	<u>Number</u>
Army	Divisions	24
Navy	Carrier Battle Groups	13
Air Force	Tactical Fighter Wings	36
Marine Corps	Marine Amphibious Force	4

2. Force structure decisions at all levels of the process, but particularly at the fiscally constrained levels, seem to be based on decisions of Senior Defense and military leaders weighing many factors of which quantitative analysis is only one. It is inherently difficult, therefore, to audit and justify in a quantitative way the force structure numbers shown in Table 2.

3. The Army and Marine Corps are authorized war reserve stocks (WRS) for major weapon systems (tanks, infantry fighting vehicles). The Air Force and Navy are not authorized WRS for their major weapon systems (ships and aircraft). (DODI 1100.19:2) This inconsistency affects the attrition rates used by all four services and the requirements for these weapon systems.

4. The services comply with the major provisions of DOD Directive 4140.47, "Secondary Item War Reserve Development." Each service, however, currently uses different methods and different assumptions to compute munitions and spares requirements. DOD conducted a Sustainability Study in 1979 (5) which describes each service's process in detail. In a more recent study of the "Wartime Requirements Determination" (6), ASD(MRA&L) found that:

a. The Army had the best method in that it used a two-sided simulation to determine ammunition use rates and attrition rates.

b. The other three services used one-sided simulations with preset attrition rates independent of targets.

c. The Army method for computing Air Defense Requirements did not take into account Air Force and Navy contributions.

d. War reserves of spares were understated for all services because of failure to account for combat losses of spares.

e. Due to the differences in assumptions and methods, it is difficult to assess whether the services are balanced with respect to each other. Similarly, it is difficult to tell whether the services are asking for enough munitions and spares, but ASD(MRA&L) indicated that there is a greater likelihood that requirements are understated rather than overstated.

5. Planning for mobilization requirements is very limited. There is no planning for conflict durations greater than 180 days. There are no stated requirements for total mobilization.

#### SYSTEMIC PROBLEM ANALYSIS

The more important problem areas encountered in the examination of the requirement process will be analyzed in this section.

1. Confusion about "Requirements." The term "military requirement," defined earlier, is subject to considerable confusion. From the view of the commander, the objectives to be accomplished are to defeat the enemy in battle; so, given a situation, he can tell you approximately what level of forces and supplies he needs. This is the way we prefer to use the term, i.e., threat-related as in the Minimum Risk or Planning Force. Unfortunately, the term is used for many other force levels, in which cases it no longer has a threat-related meaning. For example, the total number of F-16 aircraft we intend to buy in the POM or Extended Planning Annex (EPA) could be called a requirement. In fact, however, the number is related to a long-term plan to modernize our aging fleet and provide a small force growth without any claim that the force is large enough to defeat the enemy. The intended buy will simply allow us to maintain a force of a given average age at a specific time

in the future. This is an example of the general problem that any attempt to translate many of the elements called "requirements" into a useful wartime mobilization requirement would be incorrect and generally understated.

As we get farther away from the Minimum Risk Force and the Planning Force, the relationship of the "requirement" to the threat and military objective becomes less clear.

The "requirements" for major weapon systems to support the approved POM forces are based on a compromise heavily driven by external guidance and constraints (the budget and Congress).

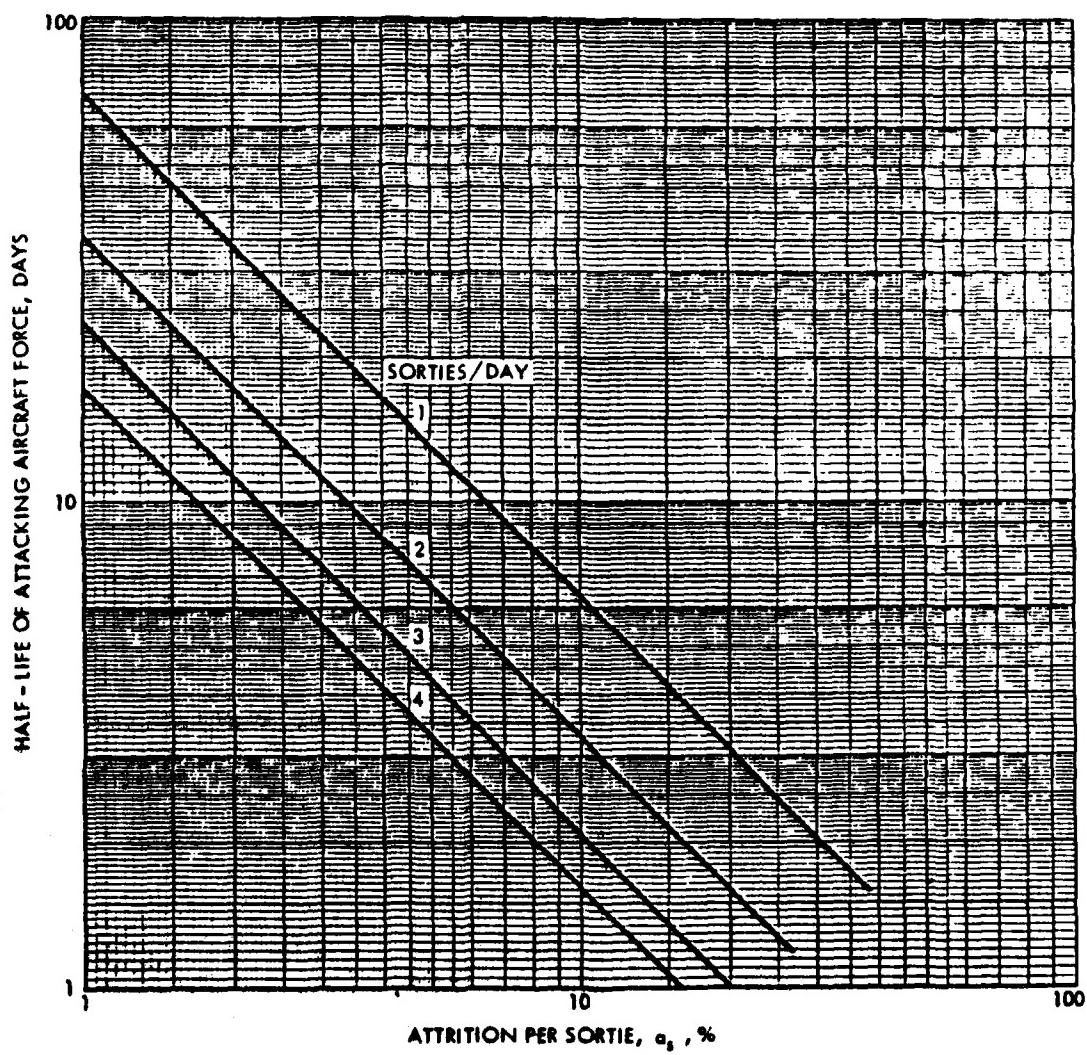
If the United States must mobilize and fight the enemy, however, the mobilization requirements should be related to the threat and objectives, not the budget. In that situation the nation would mobilize, and resources would be allocated to meet and defeat the threat. Our conclusion is that confusion over the word "requirements" will continue. Policymakers should be aware of this confusion and be careful to define what requirement they are addressing.

2. OSD Policy on War Reserve Stocks for Major End Items. The OSD policy that prevents the stocking WRS for aircraft and ships while allowing WRS stocking of tanks induces potential biases into the requirements planning process, particularly for mobilization. In addition, it may cause unrealistic optimism in those looking at results of potentially biased combat simulations using these results.

The essence of the problem is that DOD Directive 4140.47, "Secondary Item War Reserve Requirements Development," states that war reserves will be developed to support the approved forces less combat losses for the period

directed in the Defense Guidance (3). The Army and Marines can stock war reserves of the major weapon systems. The Air Force and Navy cannot preplan replacement aircraft and ships (2:2). For war reserve calculations, therefore, it is to the Army's and Marine Corps' advantage to have relatively high attrition rates, because they justify more major weapon systems and do not decrease secondary item stock requirements (e.g., ammunition). On the other hand, if the Air Force and Navy use high attrition rates in their computations, they get no more ships or aircraft; and their requirements for secondary items (bombs, missiles, and spares) decreases, because there are no aircraft or ships to deliver them. In addition, in simulations to determine Army requirements, it is to the Army's advantage to use high attrition rates for the Air Force so that Army requirements for force structure and support are conservative and do not overestimate Air Force contributions to the Air-Land Battle.

From a warfighting standpoint, the impact of attrition on a force can be seen in figure 11. The figure shows the half-life (number of days for a fleet of aircraft to decrease to half its original strength) for different attrition rates and sortie rates. For example, at 1 percent attrition per sortie and two sorties per day, an original force of 1,000 aircraft would be reduced to 500 in 35 days and to 250 in 70 days. At 1 percent attrition and one sortie per day, it would take 140 days to reduce the fleet to 250. Recognizing that our current production rate of Air Force fighter aircraft is less than 200 per year, it is clear on this example that production cannot keep pace with losses, so combat capability will suffer. Attrition rates will vary depending



**Figure 11**  
**Half-Life of a CAS Force Suffering**  
**Attrition, BA, Per Sortie**

on the aspects of the air battle, but the effect of figuring attrition without replacements is that munitions and spares may be grossly underestimated.

Although the solution to the problem is not obvious, OSD must take the lead with a consistent policy for computing requirements. The policy must not "penalize" the Air Force and Navy for high attrition while at the same time "rewarding" the Army and Marine Corps. Most importantly, the policy must encourage the most realistic estimates of our total force contribution in full or total mobilization scenarios. Only with this realism will our requirements for systems for mobilization be defined adequately. We conclude that considerable work remains at OSD, JCS, and service levels to resolve this problem.

3. Variability of the "Requirement." An apparent variability to requirements bothers some people. They feel that requirements should be constant and unchanging (except as the threat changes). Our examination of the requirements process indicated two distinct reasons why this view is not accurate. What is staying relatively constant are the resources devoted to the Department of Defense and our combat capability.

The first reason for the varying requirements is the change in national objectives and national military strategy as administrations change. General Purpose Forces have gone from neglect by Eisenhower in the period of Massive Retaliation to increased interest by Kennedy under flexible response, through retrenchment after Vietnam, back to rebuilding under Reagan. Each change has meant a shift in national military strategy -- short war to long war, 2 wars to 1 1/2 wars to 2 1/2 wars. Each change is reflected in a change in

objective force level requirements. Note, however, that the resources did not change that quickly; thus the risk associated with the new military strategy increases sharply because resources and production lead times did not track changes in the administration.

External influences on the requirements planning system are the second reason for an apparent variability of requirements. In particular, OSD and Congress tend to influence the process by imposing programs on the services. Two examples will illustrate how this occurs.

During the Carter administration, the Air Force had a "requirement" to modernize the bomber fleet to ensure the continued ability of bombers to penetrate enemy airspace to the target. The B-1 was the chosen solution, a conservative approach to retain manned aircraft force structure with an evolutionary growth in capability. OSD, on the other hand, had an idea of solving the requirement to deliver weapons on target by using cruise missiles launched from aircraft standing off from enemy territory. OSD believed that the evolutionary approach to the manned bomber was insufficient to overcome future enemy defenses and that a revolutionary approach was necessary. The Carter administration canceled the B-1 and directed speedup of the Air Launched Cruise Missile (ALCM) program. In this situation the Air Force planner has difficulty computing the requirement for ALCMs, since the original requirement for B-1s was for a flexible force structure of manned aircraft (within SALT constraints), whereas the ALCM was a single-purpose weapon hung on an existing force structure.

Another example is the current attempt by OSD to use conventional cruise missiles to destroy certain targets programmed for manned aircraft. OSD argues that cruise missiles can penetrate to many targets and destroy them for less cost than tactical aircraft, particularly when the attrition of the aircraft is considered. The Air Force believes it must maintain and evolve the tactical aircraft to allow it to attack varieties of targets. The Air Force sees the cruise missile as a threat to manned aircraft force structure. Once again, it is difficult for the Air Force planner to calculate the requirement for the conventional cruise missile weapon system.

In both of these examples, where a revolutionary way of accomplishing the mission is involved, planners have great difficulty in calculating a numerical requirement because of the philosophical disputes involved; and they usually resort to relating the numbers to economic production quantities rather than to a portion of the threat.

Robert B. Pirie, Jr., former Assistant Secretary of Defense (MRA&L) provided an OSD view of the requirements process when he wrote:

"First, needs or requirements by military organizations for people or materiel or anything else are not hard-and-fast calculations, but are estimates based upon hosts of assumptions and calculations. They tend to be very conservatively done" (24:113).

This interaction between OSD and the services on new programs and approaches to meeting military requirements seems to be healthy and should continue. The conservative nature of the military is a critical factor in the balance, providing lower risk of potentially disastrous results. The

exception to this general statement was mentioned earlier when we observed that the services understate munitions requirements and OSD tends to be conservative and press for lower risk.

4. Lack of Effective Methods for Tradeoffs of Service Requirements at the National Level. As we have noted in our evaluation of the requirements planning process, the force structure levels are heavily influenced by service interests. The Minimum Risk Force and Planning Force are service submissions, with review and comment by the JCS. The Program Force is again a service input with guidance and comment by JCS and OSD. In structuring these forces, the services rely heavily on roles and missions assigned to the services as part of the Defense Reorganization Act of 1947 or 1958. JCS and OSD would seem to have the opportunity to balance the resources allocated to each service in order to accomplish military tasks in the optimum way. They do not, however, currently exercise this opportunity in a large-scale, comprehensive manner.

JCS does use its Total Force Capability Assessment (TFCA) analysis each year to evaluate the potential of the current and program forces in the directed planning scenario. Their assessments generally highlight deficiencies in the forces and the risk areas in the JPAM. These deficiencies are not prioritized, and no suggestion is made for a different balance among the services. OSD has instituted the Defense Resources Board (DRB) to review the service programs, but the DRB is generally not provided with information that would allow tradeoffs of major missions and resources. An approach to improve the national view would be to use the TFCA to assess the Planning

Force. We suggest that the TFCA be structured additionally to examine the optimum balance among the services of the Planning Force.

A key example is the issue of strategic mobility. The recent emphasis on the RDJTF, now the Central Command, generated significant analysis of military requirements for the combat forces. When detailed planning of the mobility requirement to lift these forces was carried out, significant shortfalls were encountered. The difficulty came in getting the services, OSD, and JCS to agree how much would be done by Air Force and Navy and how they would pay for these new requirements without significant new budget allocations. It is essential in these cases that OSD and JCS be able to take a national view of the situation inasmuch as the service will tend to view mobility as a support function of lower priority than the combat mission of tactical air wings or carrier battle groups.

5. Lack of Mobilization Requirement Planning. In our findings (Chapter IV), we noted the lack of attention to mobilization requirements planning by the services. There appear to be several reasons for this.

a. An entrenched belief that future major wars will be high intensity and short warning, the potentially short in duration. It is wrongly believe, therefore, that mobilization of the industrial base will not occur in time to have any effect on the outcome.

b. Current shortfalls in readiness and sustainability are significant, and these problems must be solved before resources are devoted to industrial preparedness planning.

c. Inasmuch as there is no structured method for allocating resources toward building additional force structure in the event of total mobilization, there is no perceived need to plan for the requirements that would be demanded if the President declared Mobilization Day for the general war.

d. If we must totally mobilize, planners tend to believe that we will rely on industry to produce at maximum rate for all systems. The fact is not recognized that industry's production will be driven by defense contracts and scarce resource allocations that will be made in line with the mobilization requirements.

The result of these attitudes is that we do not know what we need to support full mobilization. Air Force and Navy planning figures are likely to be optimistic because of the bias of low attrition rates. Because we do not know the total mobilization requirements, we are unable to provide feedback and guidance to industry. Industrial planning, feedback, and advice are minimized. Although what industry can provide may not meet the requirement, the CINCs and service planners could balance and prioritize requirements and help to make the system work if industry provides impact statements. The closest thing in the current system to a Mobilization Requirement is the JCS Planning Force.

6. Alternative for Improving Mobilization Requirement Determination. Many of the problems we have noted in the requirements planning process are bureaucratic and, in principle, can be solved with a revision to the system. A possible approach to solving the problem is proposed here.

The proposal is based on the observation that the current PPBS and JSPS (with the exception of the JSCP) are midrange or longer planning documents. As such, they hope to affect the military balance in the five-to-ten year range. They are oriented to force development. Conversely, mobilization is related to warfighting with current forces in the very near term. The PPBS and JSPS look at threats in the outyears where significant qualitative and quantitative changes may occur. There is considerable risk in the threat estimate and thus a need for prudence and conservatism. The current threat, however, is technically well defined, so our estimate of what we need can be more precise.

Based on these observations, and our concern with Mobilization Requirements (not peacetime deterrence requirements), we propose using existing tools and processes at the JCS and service levels to compute Total Mobilization requirements and beyond on an annual basis.

Basically the system would work like this. As in the current system, the JSCP would be issued to the CINCs and services. They would follow the normal process of building OPLANs using the Joint Operations Planning System. In addition to noting shortfalls, as they currently do, they would continue the process with unconstrained forces, materiel, and support to determine how much it takes to win. The deficiencies would represent the shortfall in mobilization requirements that must be made up from war reserve stocks or from the industrial base. The system is shown schematically in figure 12.

Inasmuch as many of the existing computer war games cannot determine directly what it takes to win but merely give the outcome given two forces,

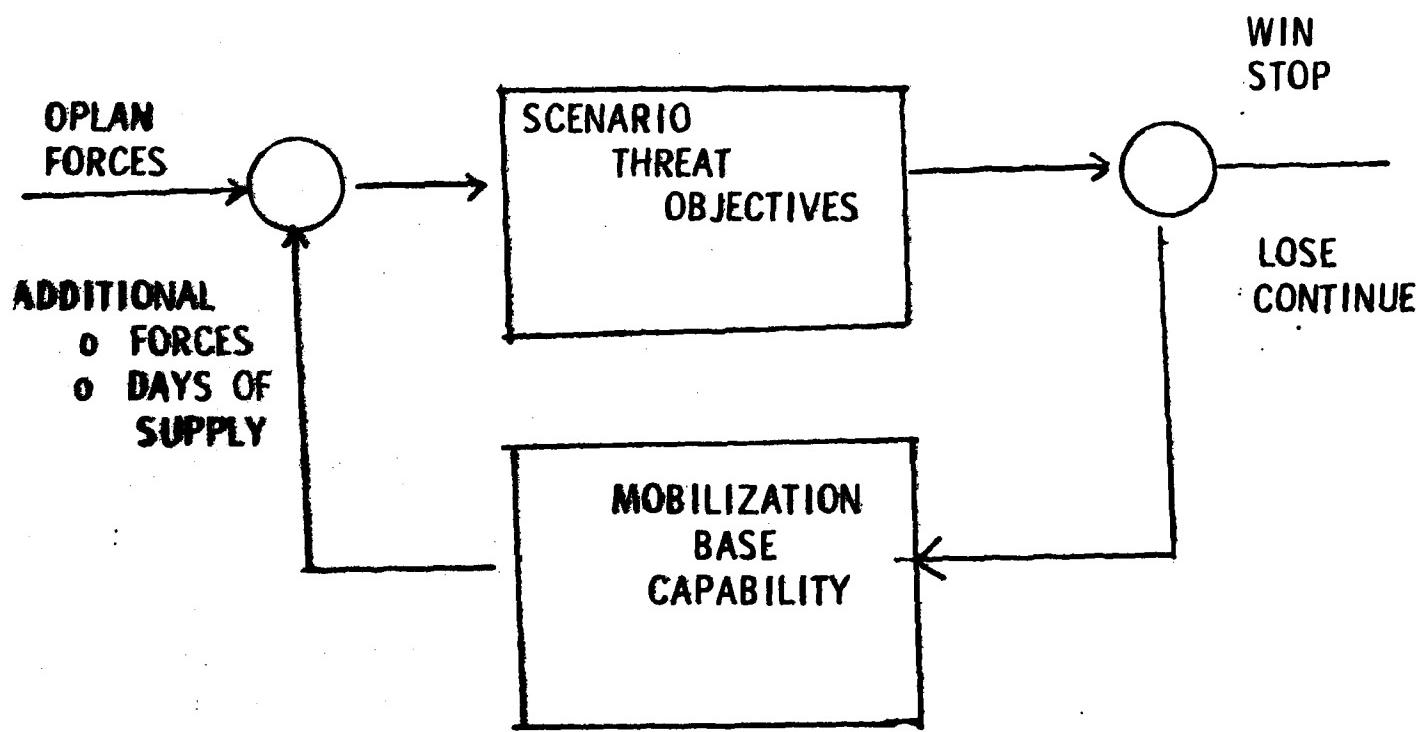


Figure 12  
Proposed System for Determining  
Mobilization Requirement

the process would be iterative. Current force levels would be war-gamed and results assessed. Alternatives would be investigated from the Mobilization Base until a win condition is obtained. Alternatives would have to based on solutions with weapon systems already in production. Alternatives of force structure versus sustainability, versus readiness, could be addressed. Also, alternatives looking at tradeoffs between the services would be examined. To illustrate this point with an example, assume it was found that conventional minefields would slow and channel the enemy's advance, resulting in fewer armor and artillery losses and less need for aircraft. The result could be a requirement for more combat engineer battalions and fewer Air Force aircraft. A solution or set of solutions would emerge to set a balanced requirement for total mobilization.

The set of solutions may all require production rates that are currently impractical. At this point industry would enter the requirements process and provide feedback on what could be done to accelerate production levels. The operations planners would assess industry feedback and prioritize their requirements. This process will lead to a prioritized set of total mobilization requirements.

A structured system needs to be devised within the DOD bureaucracy so that the industrial planner and the current operations planner iterate their proposals until both understand the other's need and capabilities and the best production schedules are selected for the priority systems. Shortfalls would be clearly identified.

Current operations planners could possibly benefit by learning the results of production rates versus attrition losses. This could lead to better insight into planning to manage attrition. Fewer sorties could be flown early, for example, in order to have a larger force later at a critical point in the conflict.

The system thus has the following characteristics.

- a. The system would be oriented toward current operations rather than outyear planning.
- b. The CINCs would be closely integrated.
- c. Requirement statements would not be constrained by funds or days of conflict.
- d. The starting point would be the current forces at current levels of readiness and sustainability.
- e. A limited number of items would be prioritized by the CINCs.
- f. Risk would be specifically addressed and quantified rather than hidden.

In summary, the proposed system would provide a prioritized set of requirements for mobilization on a current basis. It would provide a guide for industry planning. With a firm requirement, industrial preparedness planning would have a measurable effect on potential conflict and a chance to compete for finds in the budget. The process could also affect key decisions on whether to shut down an existing production line (A-10, M-60); to operate or expand a new line; or to expand an existing line. Most importantly, the military will be better prepared to fight and win.

CHAPTER V  
CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Based on the analysis of the requirements planning process, we reached the following conclusions.

1. All current service requirements for weapon systems or consumables are driven by Force Structure. Once Force Structure is determined, the number of weapon systems or consumables follows directly from straightforward computations.
2. Force structure requirement decisions at all levels of the process, but particularly at the fiscally constrained levels, seem to be based on decisions of Senior Defense and military leaders weighing many factors of which quantitative analysis is only one. Thus it is inherently difficult to audit and justify in a quantitative way how the force structure numbers are chosen.
3. The Army and Marine Corps are authorized war reserve stocks (WRS) for major weapon systems (tanks, infantry fighting vehicles). The Air Force and Navy are not authorized WRS for their major weapon systems (ships and aircraft). (DODI 1100.19:2) This inconsistency has an impact on the attrition rates used by all four services. For example, the Army uses high attrition rates to justify more tanks and munitions; the Air Force uses low attrition rates to justify more conventional munitions.

4. Planning for mobilization requirements is very limited. There is no planning for conflict durations greater than 180 days. There are no stated requirements for total mobilization. Full mobilization requirement planning is most realistic in the Army but limited in the Navy and Air Force. The Marines do not figure mobilization requirements.

5. Peacetime force programming constrains the military to fit within fiscal resources. The primary objective in peacetime is deterrence. Significant risk could exist with this force in a wartime scenario. On the other hand, mobilization planning is related to meeting military requirements in a warfighting environment.

6. The requirements for building the Planning Force or the Program Force are based on several factors:

- a. Defense Guidance on strategy
- b. Outyear threat quality and quantity (JIEP)
- c. Modernization of our forces
- d. Force structure growth
- e. Force sustainability and readiness enhancements

Mobilization requirements planning should be based on the current threat and scenario; therefore, it will not be constant over the planning period.

#### RECOMMENDATIONS

We recommend the following actions:

1. The services should define and enunciate a mobilization requirement for weapon systems clearly linked to the threat.

2. OSD and the services should use the JCS Planning Force as an interim requirement for total mobilization.

3. OSD should implement a more consistent policy for war reserve stocks of major weapon systems (aircraft and ships) to remove the potential for bias that the current policy introduces into the attrition calculation process. This action would allow the services to show realistic requirements for mobilization.

4. The Joint Staff should continue to improve its ability to assess the Planning and Program forces of the services and make recommendations for tradeoffs to the JCS and OSD.

5. The JCS and services should adopt a new process for determining weapon system requirements for mobilization. The system will determine a prioritized set of weapon systems and support requirements based on the following factors:

- a. JSCP strategy guidance
- b. Current and projected threat
- c. Current and projected force structure
- d. Interface with CINCs
- e. Combat beyond D+180
- f. Unconstrained funds
- g. Interaction with industry

APPENDIX  
U.S. ARMY WAR RESERVE MATERIEL

War Reserve Materiel "is that which is required in peacetime to meet increased military requirements upon an outbreak of war and is intended to provide support essential to sustain operations until resupply can be effected" (16:8-1).

Again, these stocks are based on the program force structure of the total Army (i.e., Active, Reserve, ANG) at the end of the POM period.

War Reserve Materiel consists of two major categories. The first is Prepositioned War Reserve Materiel Stocks (1) overseas, including (A) theater war reserves authorized in days of supply and (B) Department of the Army approved operational project stocks, including prepositioning of materiel configured to unit sets (POMCUS); and (2) those war reserve stocks held in the continental United States (A) for a specified force or area, or DA-approved operational project requirements and contingency support stocks, and (B) those stocks prepositioned for medical facilities.

The second category is Other War Reserves Materiel, consisting of (1) major end items authorized for procurement and retention that are not prepositioned to meet pre-N day distribution requirements; and (2) secondary end items and repair parts.

Operational project assets are those held to support requirements of a specific plan, project, or operation.

Contingency stocks are those held to provide combat consumption for an approved CONUS-based worldwide contingency force other than NATO.

Assets are also held in a war reserves code for reserve component forces designated to be called to active duty if necessary.

The Army accounts for these War Reserves stocks as depicted in Table 3.

Table 3

War Reserve Stock Accounts

General Mobilization Reserve  
Specific War Reserves  
Contingency Support Stocks  
Operational Project Stocks  
CONUS Prepositioned Stocks  
Early Reserve Component and Full  
Army Mobilization War Reserve  
Special Contingency Stocks

The Department of the Army conducts this war reserve requirements determination process in compliance with annual DOD guidance using a basic five-year planning horizon. The requirements branch of the Deputy Chief of Staff for Operations (DCSOPS) looks at the force structure based upon full mobilization in the last year of the Program Objective Memoranda (POM). Based upon this force structure (i.e., number and type of Army units and their authorized equipment, and the wartime scenario as specified in DOD guidance) basic weapons systems requirements are generated. The Army's Concepts Analysis Agency (CAA) then takes the programmed force and its associated equipment and conducts computer simulations based upon a 180-day conventional NATO wartime scenario. Factors such as opposing force strengths, capabilities and tactics are considered in determining equipment attrition due to direct

combat and combat-related losses and consumption. The resultant attrition estimates are then submitted to DCSOPS-Requirements; and DCSOPS provides these data to the Office of the Deputy Chief of Staff for Research, Development and Acquisition (DCSRDA), who uses them as input for the War Reserves Stockage List (WARSL) computations. DCSRDA then provides an initial WARSL to the U.S. Army Materiel Development and Readiness Command (DARCOM) and Major Subordinate Commands for review and comment and recommended additions and deletions. After the review is completed, the finalized WARSL is forwarded to the Office of the Deputy Chief of Staff for Logistics (ODSLOG) for approval. Once approved, the WARSL becomes part of the AFAD.

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